

# PATENT SPECIFICATION

(11) 1 251 432

## DRAWINGS ATTACHED

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 B8C 15A 15D 15E1 25D



## (54) CONTAINER

(71) We, MONSANTO COMPANY, a corporation organised under the laws of the State of Delaware, United States of America, of 800 North Lindbergh Boulevard, St. Louis 66, State of Missouri, United States of America, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention relates to containers and more specifically to containers designed for holding and discharging substantially solid substances from the containers in one piece.

There are many well-known types of containers for holding substantially solid substances which are designed to fulfil a number of requirements, such as venting, stacking, rigidity and the like, which are specifically required for the particular product being packaged. A well-known variety is the so-called tray and over-wrap wherein substantially solid materials such as fruit, cakes and the like are supported by the rather rigid tray and protected from the elements by a flexible film over-wrap sealed to the tray. When the overwrap is removed, however, the packaged goods tend to be inadequately supported by the tray. Deepening the recesses in the tray helps to resolve this problem but makes the removal of substantially solid substances in one piece more difficult.

It is therefore an object of the present invention to provide a container designed for holding and discharging a substantially solid substance which facilitates the removal of the substance in one piece.

Accordingly there is provided by the present invention a container having a base for supporting the container having a peripheral edge, a centre portion and an intermediate flexing portion disposed generally around the centre portion and corrugated outwardly towards the sidewall relative to the centre portion, and a sidewall integral with the base and connected at its lower end to the peripheral

edge of the base, the configuration and thickness of the base in axial cross-section being designed so that it has greater flexibility of the sidewall. *axial flexibility in relation to the lateral.*

In a further embodiment of the invention there is provided a container in which the base has a rounded peripheral edge and a sidewall integrally connected to the peripheral edge and having a plurality of longitudinally disposed ribs.

It is preferred that the sidewall of the container has a plurality of longitudinally disposed ribs and that the average thickness of the base is 1/8 to 7/8 the average thickness of the sidewall. Examples of containers according to the present invention are illustrated in the Drawings, in which:—

Figure I shows a side view of a container according to the present invention;

Figure II shows a bottom view of a second embodiment of the container;

Figure III shows a section of the base of the container shown in Figure II, along the line III—III;

Figure IV shows a sectional elevation of the container illustrated in Figure I, and the method of removing the contents of the container by pressing the bottom portion;

Figure V shows a bottom view of a third embodiment of the container;

Figure VI shows a side view of a fourth embodiment of the container, in which there are two recesses; and

Figure VII shows a top view of the container illustrated in Figure VI.

Referring to the Drawings and more particularly Figure I, there is shown a container (10) having a sidewall (12) and an integrally connected base (14) shaped so as to enhance deformation or flexing in the axial direction. The configuration of the base is illustrated more clearly in Figures II and III wherein the base (14) is shown having a spiral groove (16) spiralling outwardly from the centre portion (18) of the base (14). Referring again to Figure I, it can be seen that the sidewall (12)

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of the container (10) is provided with a series of substantially parallel ribs (20) which provide increased resistance to deformation in the lateral direction. By means of this construction, a substantially solid substance, such as a cupcake (22), held within the container (10), can be readily discharged in one piece by pressing the flexible container bottom upwardly, using a finger or other means, thereby forcing the cupcake upwardly so that the upper portion of the cupcake (22) can be gripped by hand or other means as shown in Figure IV.

In the container illustrated in Figure V the bottom grooves (24) are circular, as distinct from the spiral arrangement shown in Figure II, which will flex in a similar manner to the container bottom shown in Figure II.

In Figure VI there is shown a container (40) which is particularly adaptable for holding more than one cupcake or other substantially solid substance. In this embodiment, two recesses (42 and 44) are employed, each having strengthened sidewalls and flexible bases. In addition, other special features have been incorporated in this container (40) which contribute unique structural characteristics. For example, to prevent the recesses (42 and 44) of the container (40) from folding towards each other and to provide structural strength between the recesses, the sidewall axis lengths between the two recesses are reduced such that the upper marginal edges (46 and 48) of these sidewalls at the portion between the recesses extend rather abruptly downwards to a land or section (50) connecting the two recesses (42 and 44). In addition, a flange section (52) which can be seen more clearly in Figure VII is integrally connected to the upper marginal edges of both recesses, except at the land area wherein it is connected to upper extensions of the land or section (50), and extends outwardly in a substantially horizontal manner to provide a surface (54) whereby a film or sheet such as the film (56) shown in Figure VI can be secured by any means to provide a hermetically sealed package. As shown in Figure VII the bases (58 and 60) of the recesses (42 and 44), respectively, are constructed similarly to that shown in Figure II to provide a special bottom flexing effect. In addition, it has been found that the bottom flexing action can be enhanced by reducing the base wall thickness in relation to the sidewall thickness such that both the base configuration and base thickness contribute to the flexing action.

In general, the containers of the present invention are designed for holding substantially solid substances such as, for example, cakes and fruit, as opposed to liquids or granular materials. These containers have a base and integrally connected sidewall wherein the combined configuration and thickness of the base in axial cross-section is designed to provide greater axial flexibility in relation to the lateral flexibility of the sidewall of the container.

Consequently, substantially solid substances can be readily removed from these containers in substantially one piece by pressing upwardly against the base, forcing a portion of the packaged substance above the upper edge of the sidewall of the container so that it can be gripped and removed from the container in substantially one piece.

The preferred container for accomplishing this purpose is one with a base wall for supporting the container having a peripheral edge integrally connected to a sidewall, a centre portion which may be a point or greater area and having an intermediate flexing portion disposed generally around the centre and being corrugated outwardly towards the sidewall relative to the centre.

The bottom flexing action is obtained primarily by the widening of the grooves and ridges of the corrugations when axial pressure is applied to the base. The corrugations extend outwardly from the centre so that the grooves and ridges will expand inwardly and upwardly in response to the applied pressure. The grooves and ridges of the corrugation will extend generally around the centre of the base so that the expansion of the corrugations is fairly equal all around the centre. Two embodiments of corrugations are shown in the drawings wherein the grooves and ridges extend spirally in one embodiment and in concentric rings in the other. However, it is also possible to extend the grooves and ridges of the corrugations around the centre in a square, hexagonal or other pattern, if desired, as long as the expansive effect of the corrugations are approximately equivalent around the centre. One corrugation extending outwardly from the centre will work, although it is generally preferable to have between two to four formed in any manner, such as the spiral described above.

To enhance the flexibility of the base in relation to the sidewall it may be desirable to reduce the thickness of the base wall such that the average base wall thickness is  $1/8$  to  $7/8$  the average sidewall thickness.

The overall container thickness may vary substantially, as long as the base of the container is fairly readily flexible to finger pressure. In general, the containers of the present invention are formed from plastics, primarily substantially thermoplastic in nature, such as, for example, polystyrene and the average sidewall thicknesses of such plastics will generally vary between 0.002 to 0.020 inch and more generally between 0.003 to 0.010 inch. The average wall thickness of the base may be the same or greater or less than the average wall thickness of the sidewall. If the average base wall thickness is greater than the average sidewall thickness, it may be necessary to form ribs or other discontinuities in the sidewall to increase sidewall resistance to lateral deflection when held. The sidewall is generally peripheral

ally continuous, that is, without seams, and is preferably shaped frusto-conically upwardly and outwardly from the peripheral base edge of the container although other shapes may be employed if desired.

Figures VI and VII illustrate a receptacle with some special features incorporated in it. In the first instance this general type of receptacle has two or more recesses, each with a flexible base, for holding a plurality of substantially solid substances such as cupcakes. In order to prevent the recesses from folding inwardly towards each other there is a special structure formed by extending a portion of the upper edge of each recess sidewall downwardly to a land or section connecting adjacent recesses. This section, the cross-section of which may be, for instance, flat or curvilinear imparts unusual structural stability to the receptacle body which is generally of a thin-walled plastic material. Along the upper edges of the recess sidewalls is an integrally connected flange which extends outwardly from the sidewalls in a generally planar manner to provide an upper surface whereby a film or sheet of a material, such as plastics or paper may be secured to cover the recess openings, thereby hermetically sealing the contents of the package. If desired, ribbing and the like may be formed in the recess sidewalls to increase resistance to lateral deflection when held. In the preferred embodiment of Figures VI and VII the ribs extend from about the bottom of each recess up the recess sidewall. Each of the ribs terminates in about the same plane perpendicular to the recess axis and thus provides improved structural stability to the overall package.

#### WHAT WE CLAIM IS:—

1. A container having a base for supporting the container having a peripheral edge, a centre portion and an intermediate flexing portion disposed generally around the centre portion and corrugated outwardly towards the sidewall relative to the centre portion, and a sidewall integral with the base and connected at its lower end to the peripheral edge of the base, the configuration and thickness of the base in axial cross-section being designed so that it has greater axial flexibility in relation to the lateral flexibility of the sidewall.

2. A container according to Claim 1 in which the sidewall has a plurality of longitudinally disposed ribs.

3. A container according to either of the preceding claims in which the average thickness of the base is  $1/8$  to  $7/8$  of the average thickness of the sidewall.

4. A container according to any of the preceding claims in which the peripheral edge is substantially circular with the integrally con-

nected sidewall extending upwardly and outwardly from it.

5. A container according to any of the preceding claims in which the intermediate flexing portion of the base is corrugated in the form of a spiral

6. A container according to any of Claims 1 to 4 in which the intermediate flexing portion of the base is corrugated in the form of concentric rings.

7. A container according to any of the preceding claims in which the sidewall thickness is between 0.002 and 0.020 inch and is formed from a thermoplastic resin.

8. A container according to Claim 1 substantially as described with reference to the accompanying drawings.

9. A plastics receptacle comprising a plurality of containers each comprising a base for supporting the container having a peripheral edge a centre portion and an intermediate flexing portion disposed generally around the centre portion and corrugated outwardly towards the sidewall relative to the centre portion, and a sidewall integral with the base and connected at its lower end to the peripheral edge of the base, the configuration and thickness of the base in axial cross-section being designed to provide greater axial flexibility in relation to the lateral flexibility of the sidewall.

10. A receptacle comprising a plurality of containers according to any of Claims 2 to 10.

11. A receptacle according to either of Claims 9 and 10 in which the upper end of the sidewall of each container is defined by an upper edge, a portion of which extends downwardly to connect a section which in turn connects a portion of the upper edge of an adjacent container.

12. A receptacle according to Claim 11 in which the upper edge of each container, excepting that portion which extends downwardly to connect an adjacent container, is integrally connected to an outwardly extending flange.

13. A receptacle according to any of Claims 10 to 12 in which the sidewall of each container has a plurality of longitudinally disposed ribs extending upwardly from the proximity of the peripheral edge of the base each of the ribs terminating in substantially the same plane perpendicular to the container axis.

14. A receptacle according to Claim 9 substantially as described with reference to the accompanying drawings.

15. A container according to any of Claims 1 to 6 which is formed from a plastics material.

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## **ERRATA**

**SPECIFICATION No. 1,251,432**

Page 1, line 49, *after* "greater" *insert* "axial  
flexibility in relation to the lateral"

Page 3, line 48, *for* "conguration" *read* "con-  
figuration"

**THE PATENT OFFICE**  
*15th February 1972*

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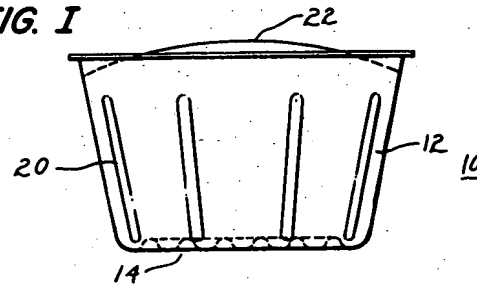
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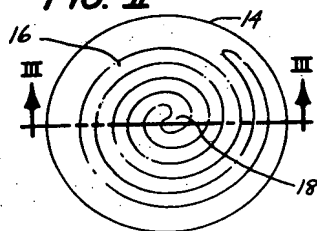
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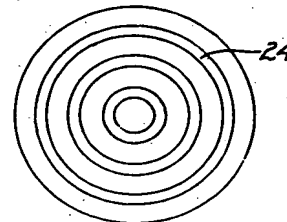
**FIG. I**



**FIG. II**



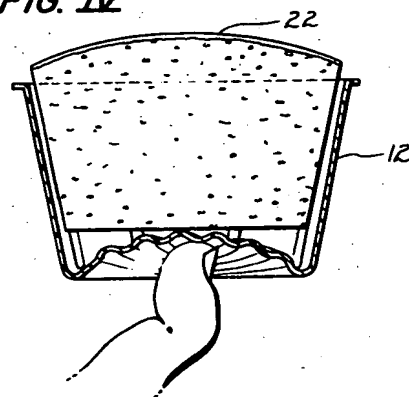
**FIG. V**



**FIG. III**



**FIG. IV**



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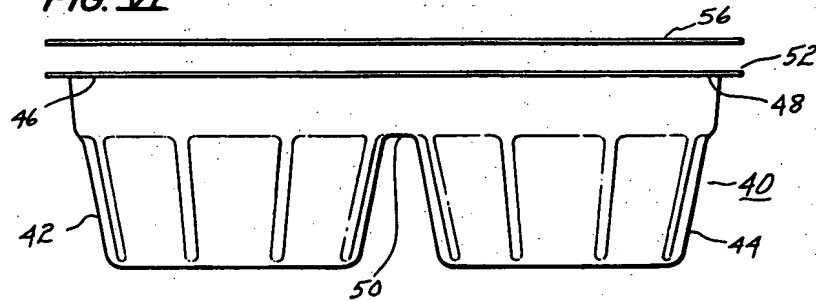
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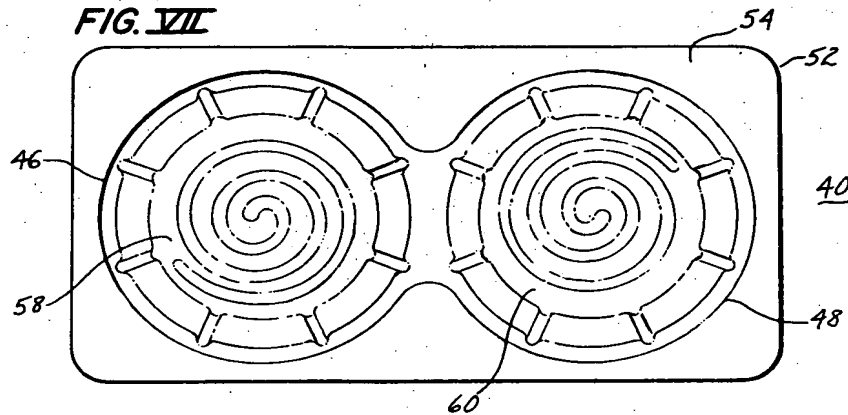
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Sheet 2

**FIG. VI**



**FIG. VII**



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